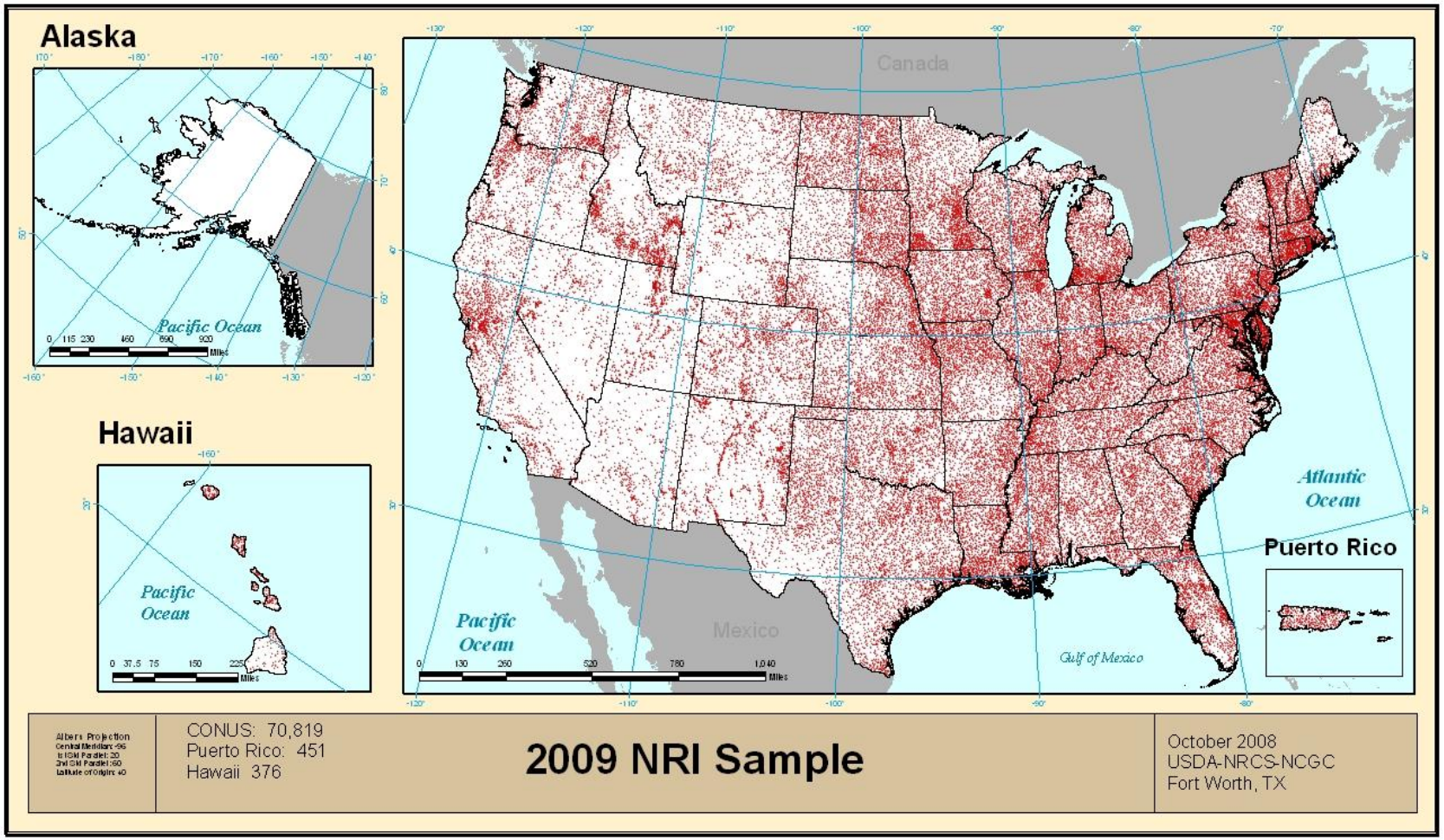
United States Department of Agriculture
Natural Resources Conservation Service

USDA NRCS

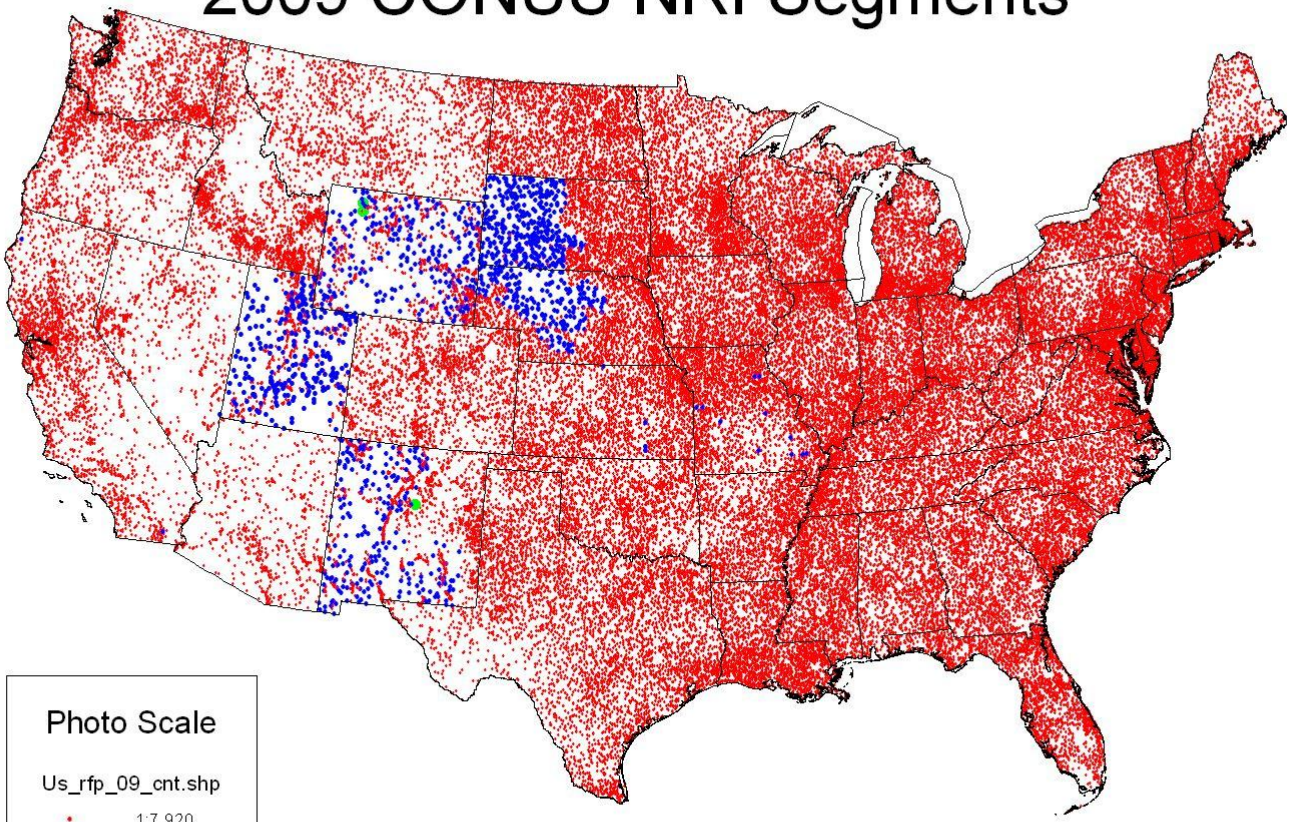
NRI and WRP Photography

Dorsey Plunk
NRCS-NCGC
Dec. 8, 2009



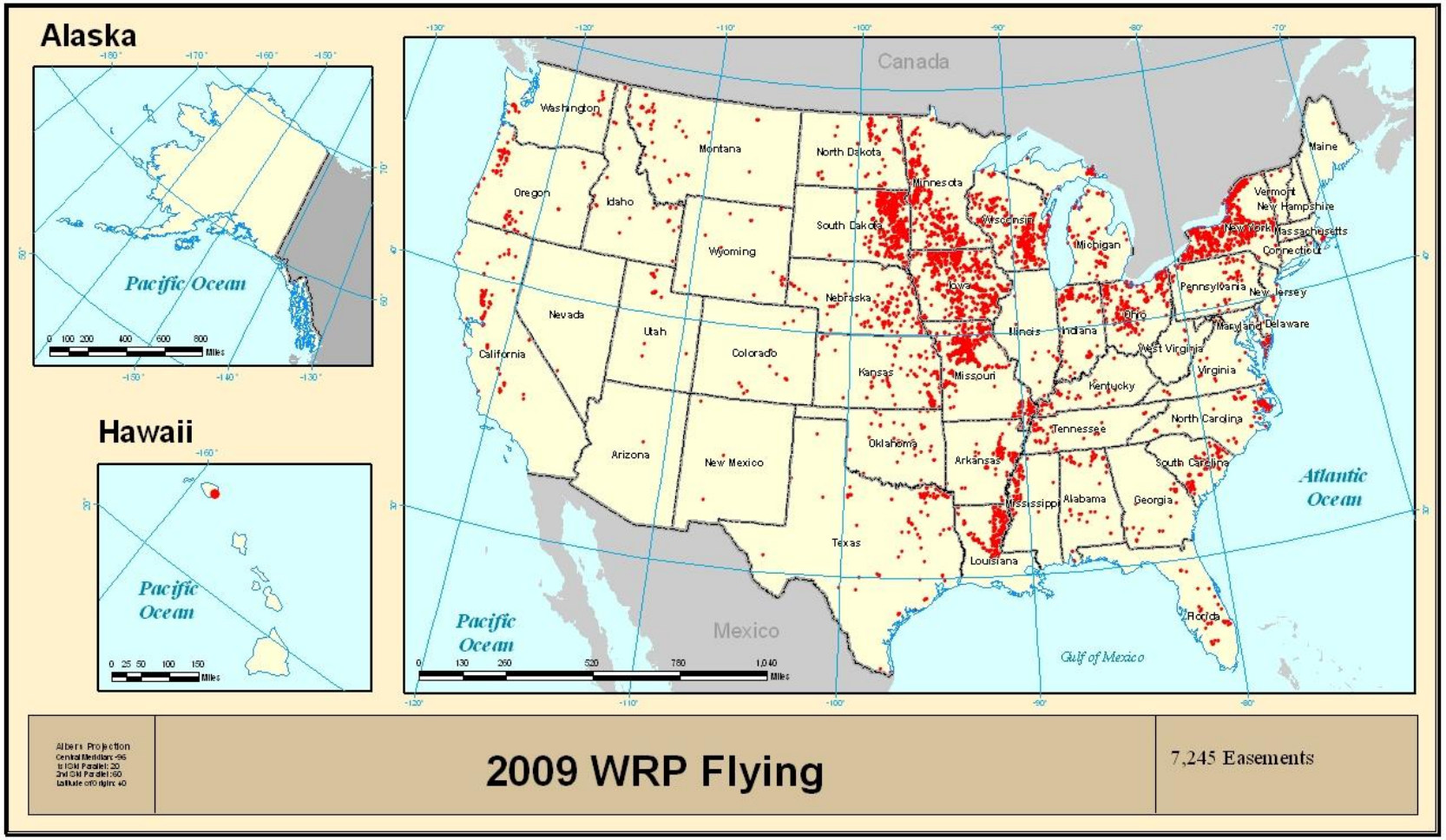
7 sites in MD and 8 sites in UT unflown because of restricted airspace

2009 CONUS NRI Segments

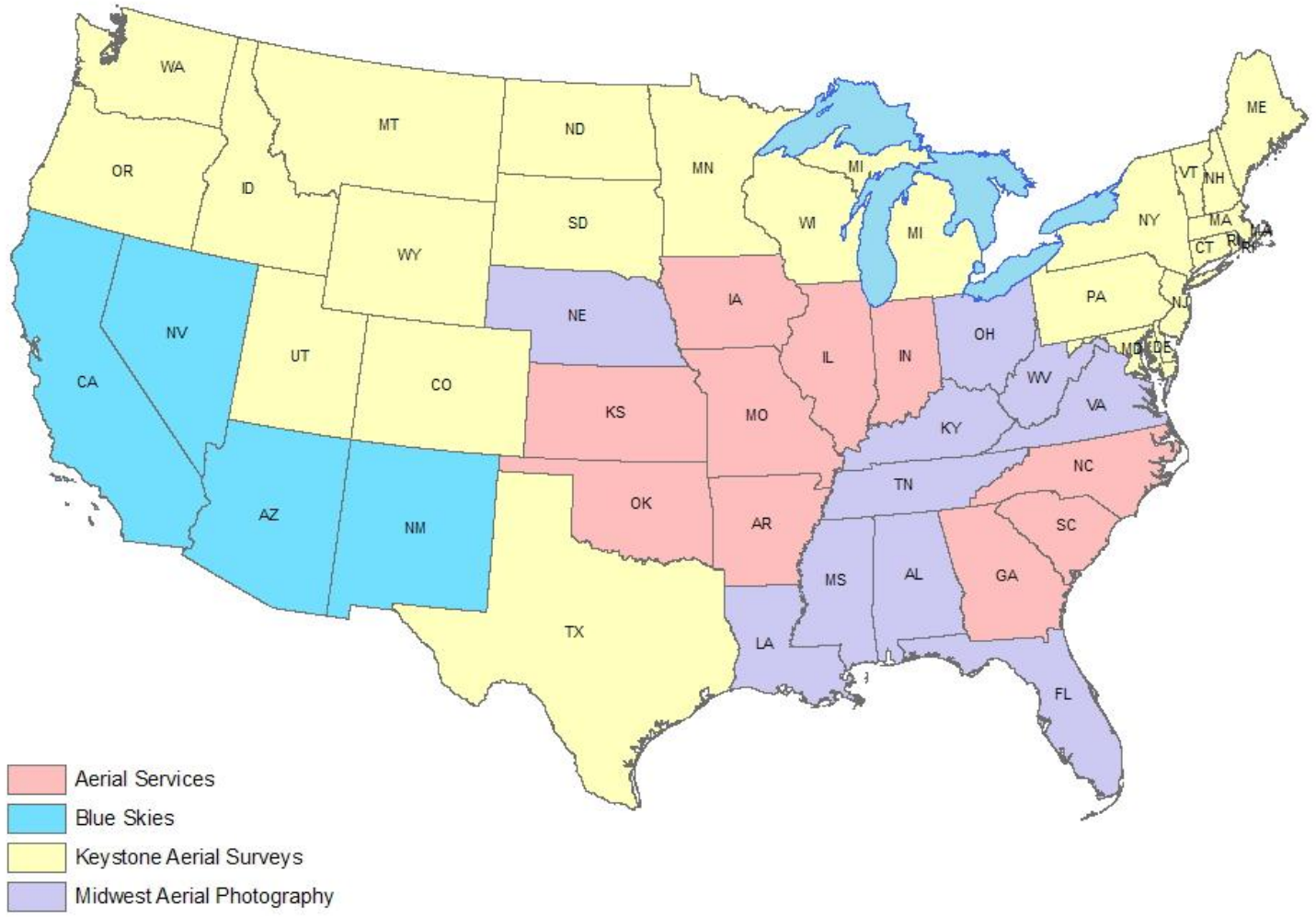


USDA Natural Resources Conservation Service

NCGC Fort Worth, Texas, Oct. 2008


Alaska
Pacific Ocean
0 100 200 400 600 800 Miles
Hawaii
Pacific Ocean
0 25 50 100 150 Miles
Canada
Washington
Montana
North Dakota
Minnesota
Oregon
Idaho
South Dakota
Wisconsin
Michigan
Wyoming
Nebraska
Iowa
Illinois
Indiana
Ohio
Nevada
Utah
Colorado
California
Kansas
Missouri
West Virginia
Kentucky
Virginia
Maryland
Delaware
Pennsylvania
New Jersey
New York
Connecticut
Massachusetts
Vermont
New Hampshire
Maine
Tennessee
North Carolina
Oklahoma
Arkansas
South Carolina
Arizona
New Mexico
Mississippi
Alabama
Georgia
Texas
Louisiana
Florida
Atlantic Ocean
Pacific Ocean
Mexico
Gulf of Mexico
0 130 260 520 780 1,040 Miles
Albers Projection
Central Meridian: -96
1st Std Parallel: 20
2nd Std Parallel: 60
Latitude of Origin: 40
2009 WRP Flying
7,245 Easements

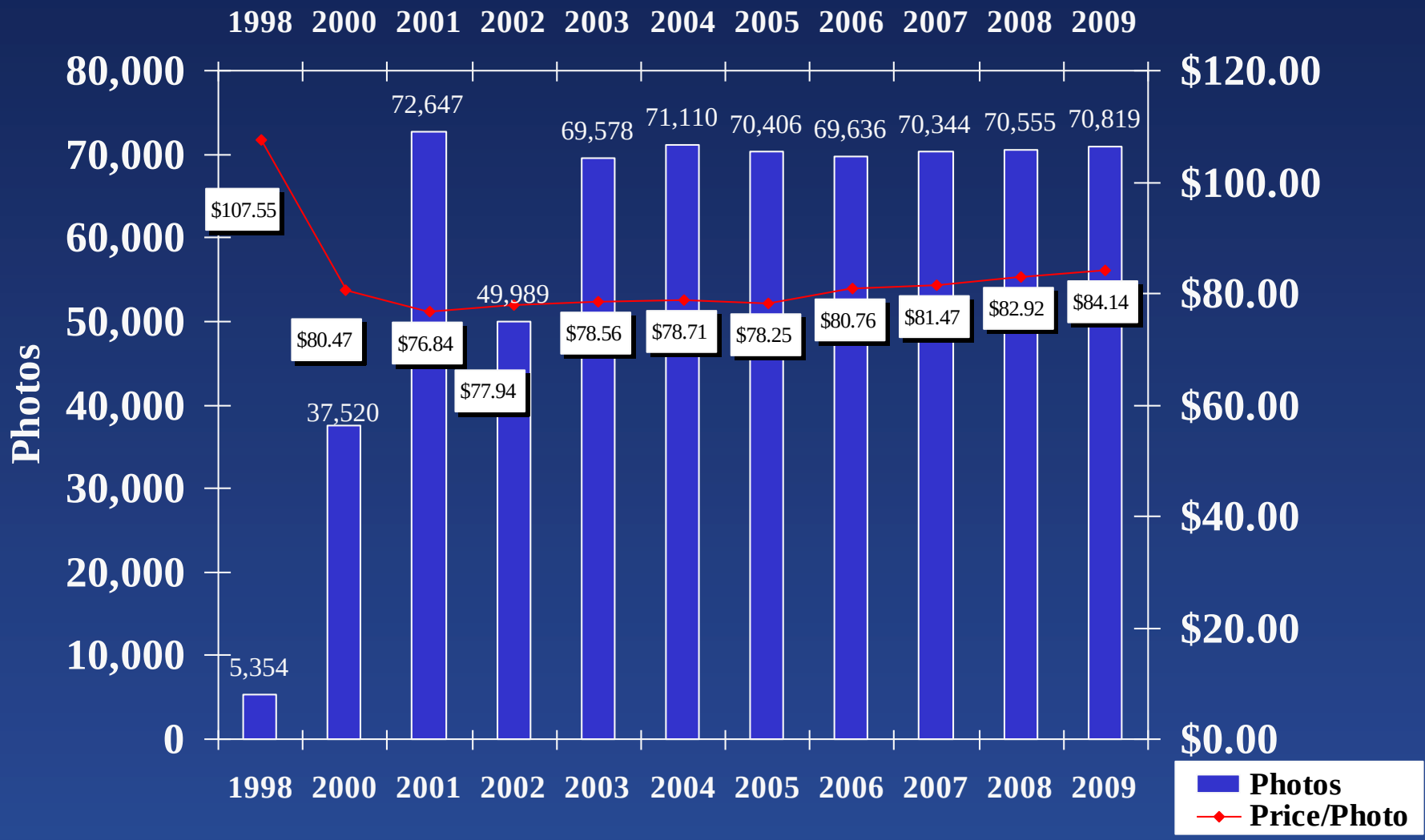
2009 NRI/WRP Contractors



United States Department of Agriculture
Natural Resources Conservation Service

USDA NRCS

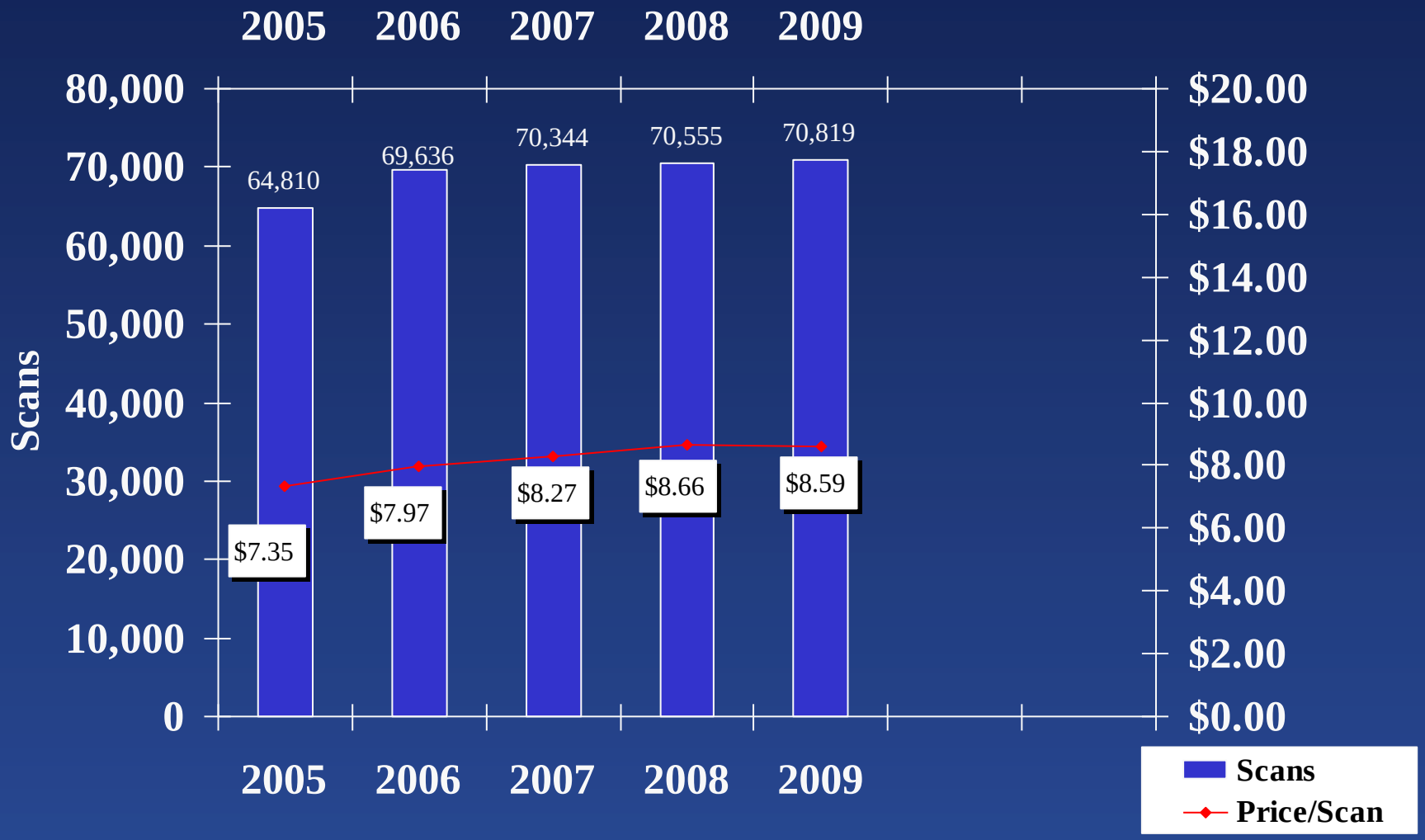
CONUS Photos Contracted & Prices 1998-2009



United States Department of Agriculture
Natural Resources Conservation Service

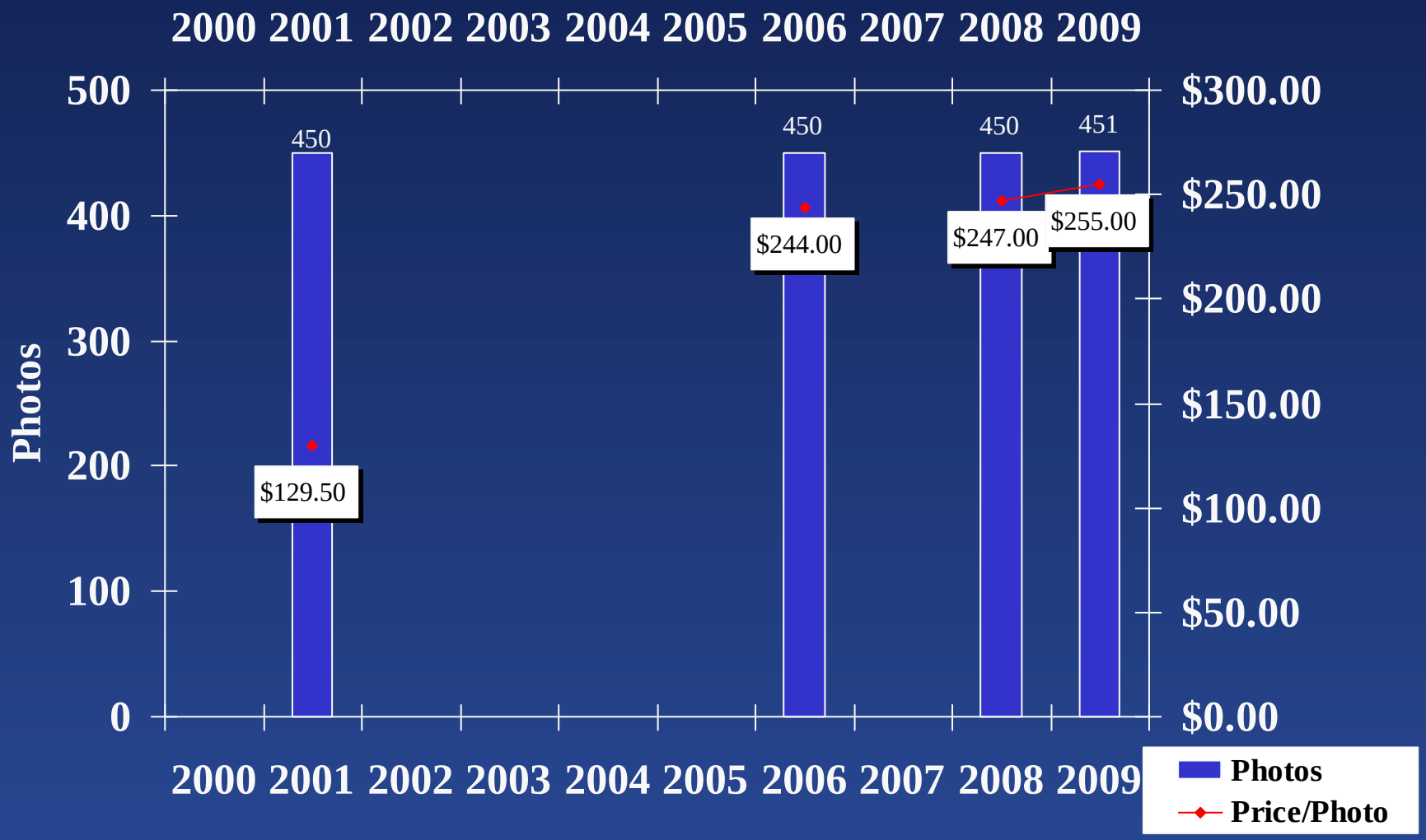
USDA NRCS

CONUS Scans Contracted & Prices 2005-2009



United States Department of Agriculture
Natural Resources Conservation Service

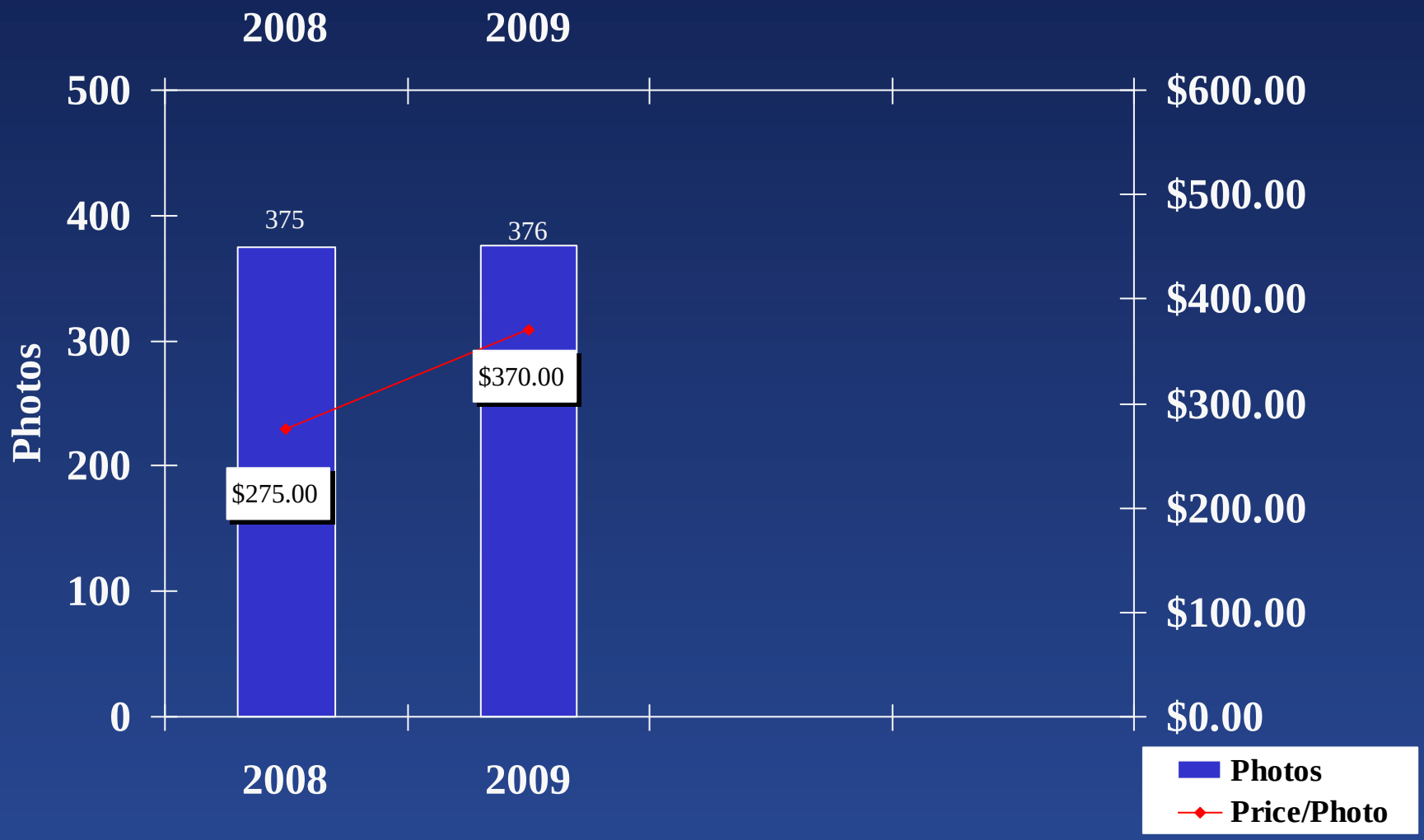
Puerto Rico & USVI 2000-2009



United States Department of Agriculture
Natural Resources Conservation Service

USDA NRCS

Hawaii 2008-2009



United States Department of Agriculture
Natural Resources Conservation Service

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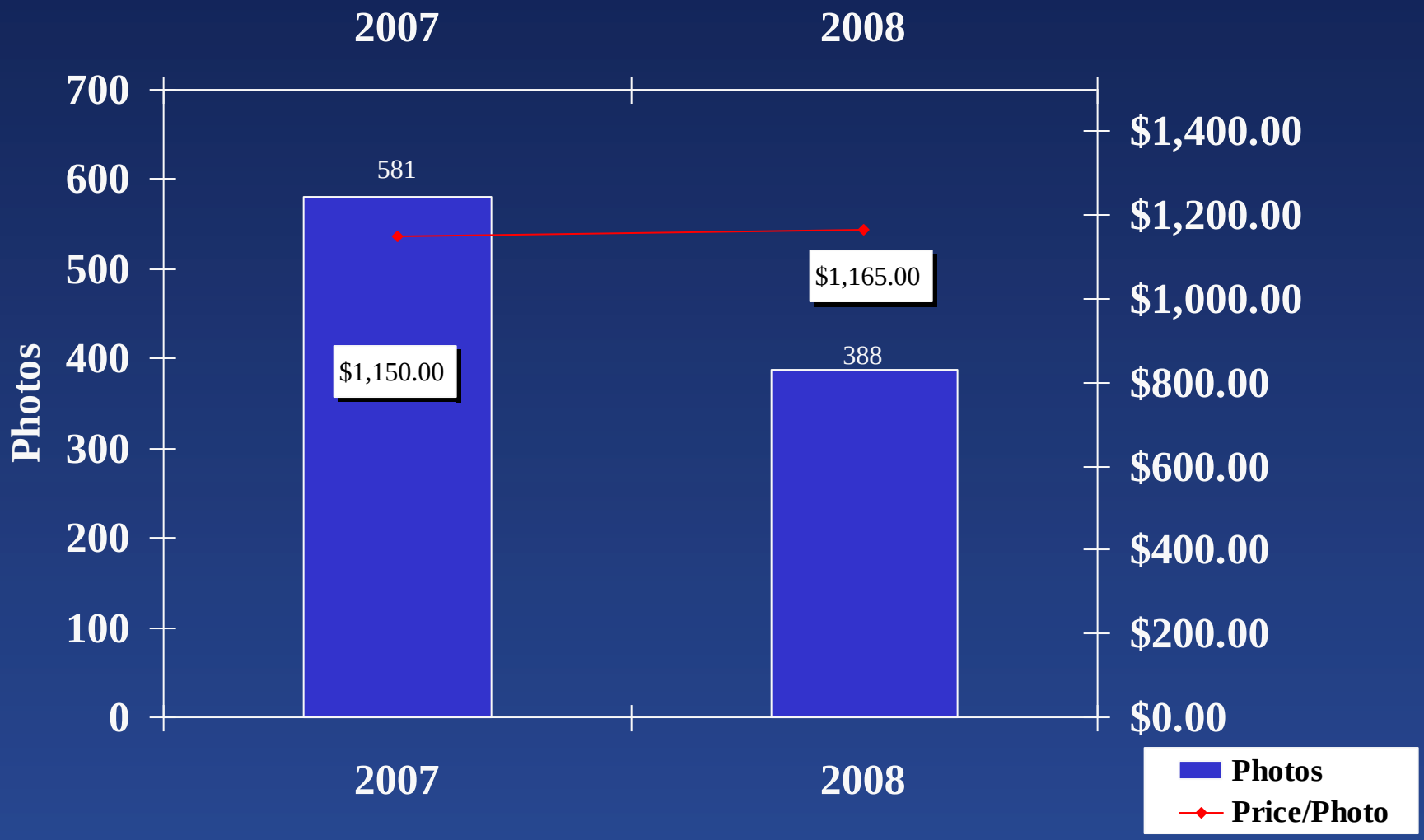
Alaska 2007 - 2008



United States Department of Agriculture
Natural Resources Conservation Service

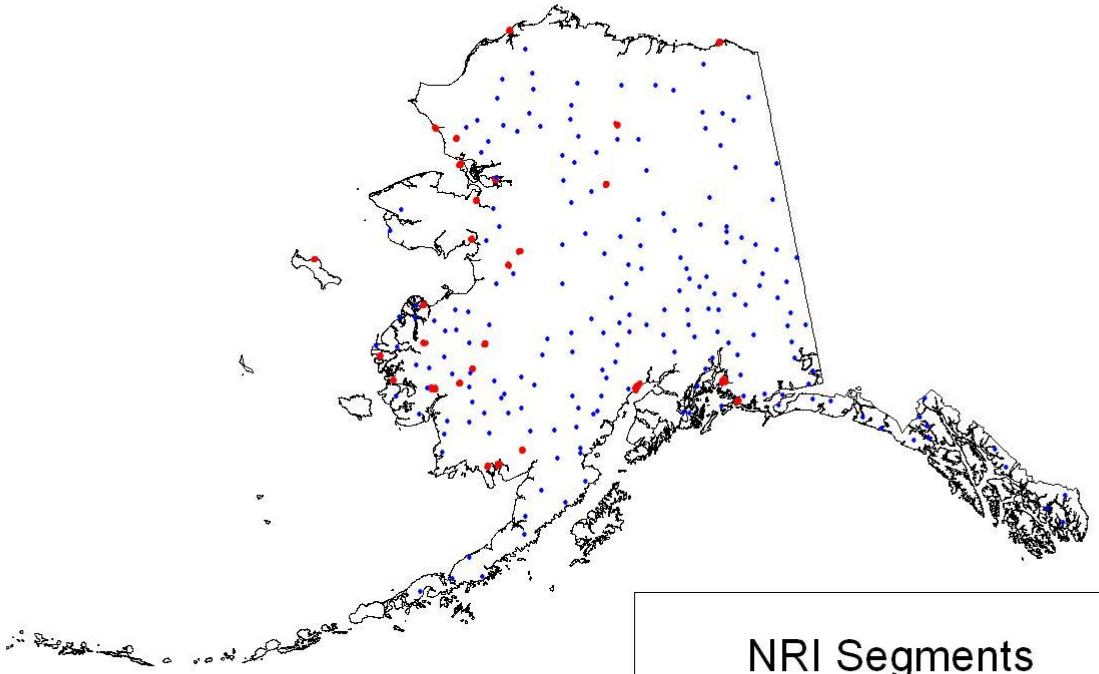
USDA NRCS

WRP Photos/Scans Contracted & Prices 2007-2009

U.S. Department of Agriculture

Natural Resources Conservation Service

2007 NRI Sample



NRI Segments

- Akhmapsu2acquire07_cnt.shp
- Akbushfootprint2acquire07_cnt.shp

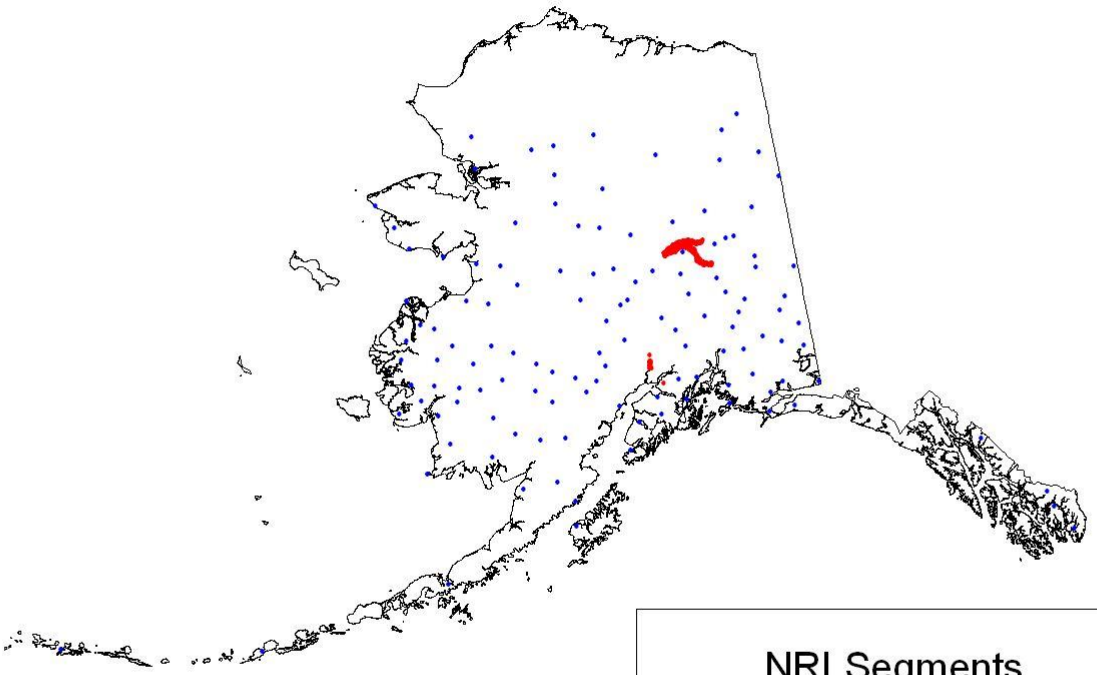
197 Bush
384 H

USDA-NRCS-NCGC, Fort Worth, TX, Oct. 08

U.S. Department of Agriculture

Natural Resources Conservation Service

2008 NRI Sample



NRI Segments

- Ak_hmasegs2acquire2008_cnt_rev2.shp
- Ak_bushfootprint2acquire2008_cnt.shp

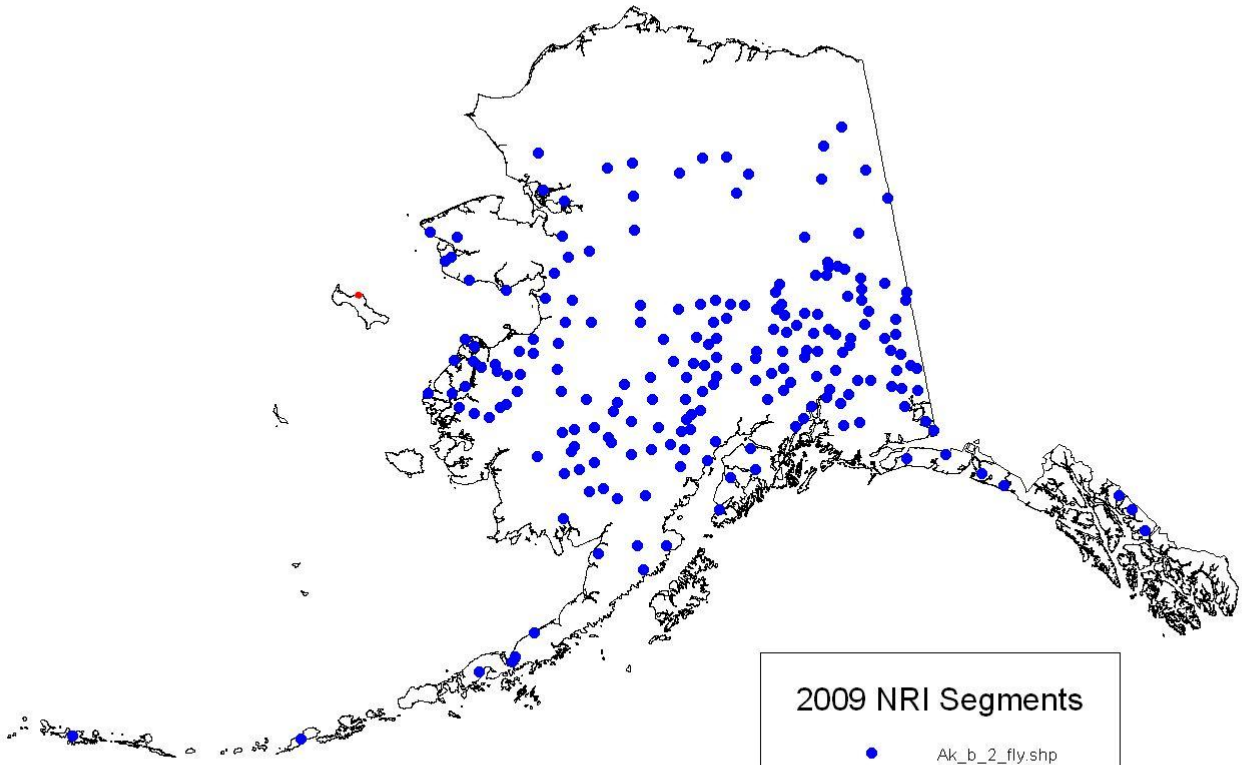
128 Bush
260 H

USDA-NRCS-NCGC, Fort Worth, TX, Oct. 08

U.S. Department of Agriculture

Natural Resources Conservation Service

2009 NRI Sample



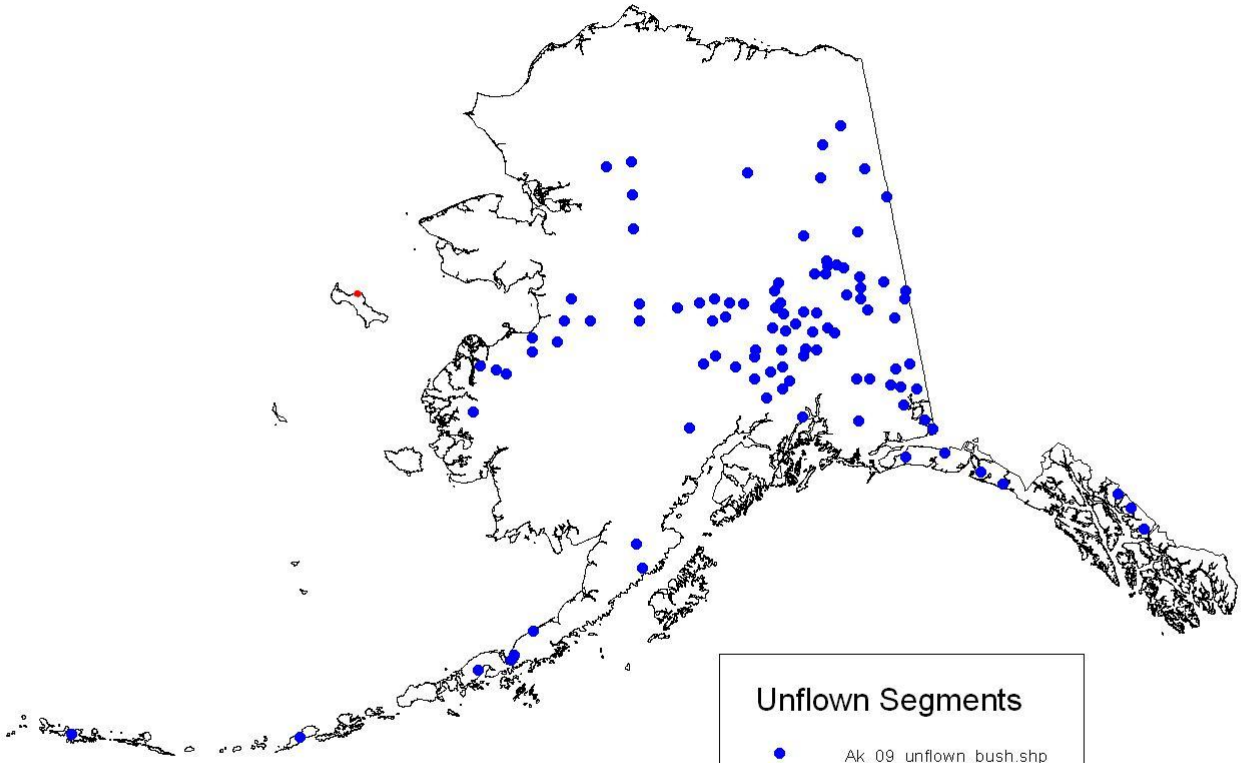
Unflown at end of 2008
207 Bush
12 High Intensity

USDA-NRCS-NCGC, Fort Worth, TX, Oct. 09

U.S. Department of Agriculture

Natural Resources Conservation Service

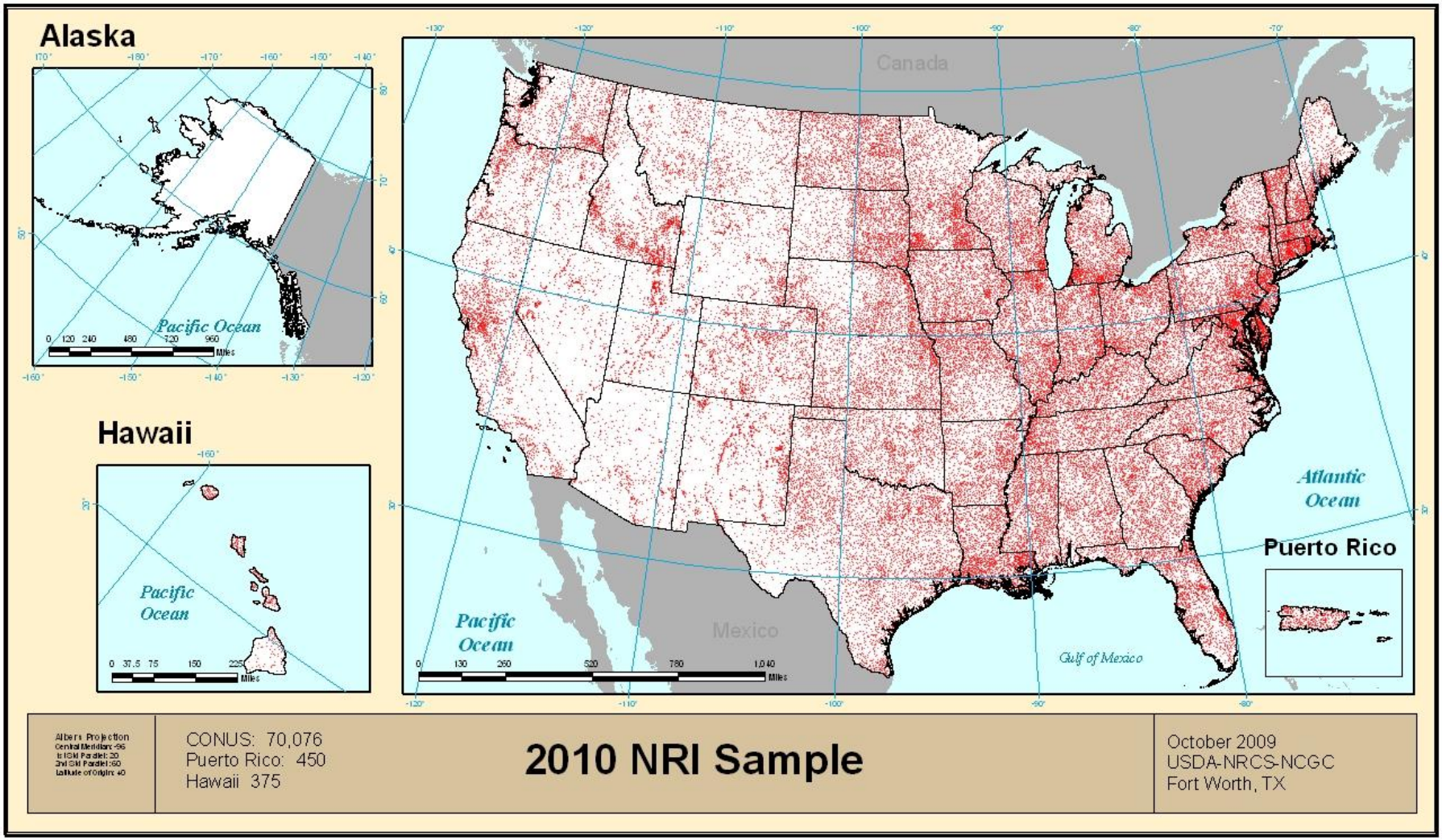
Unflown 2009 NRI Sample

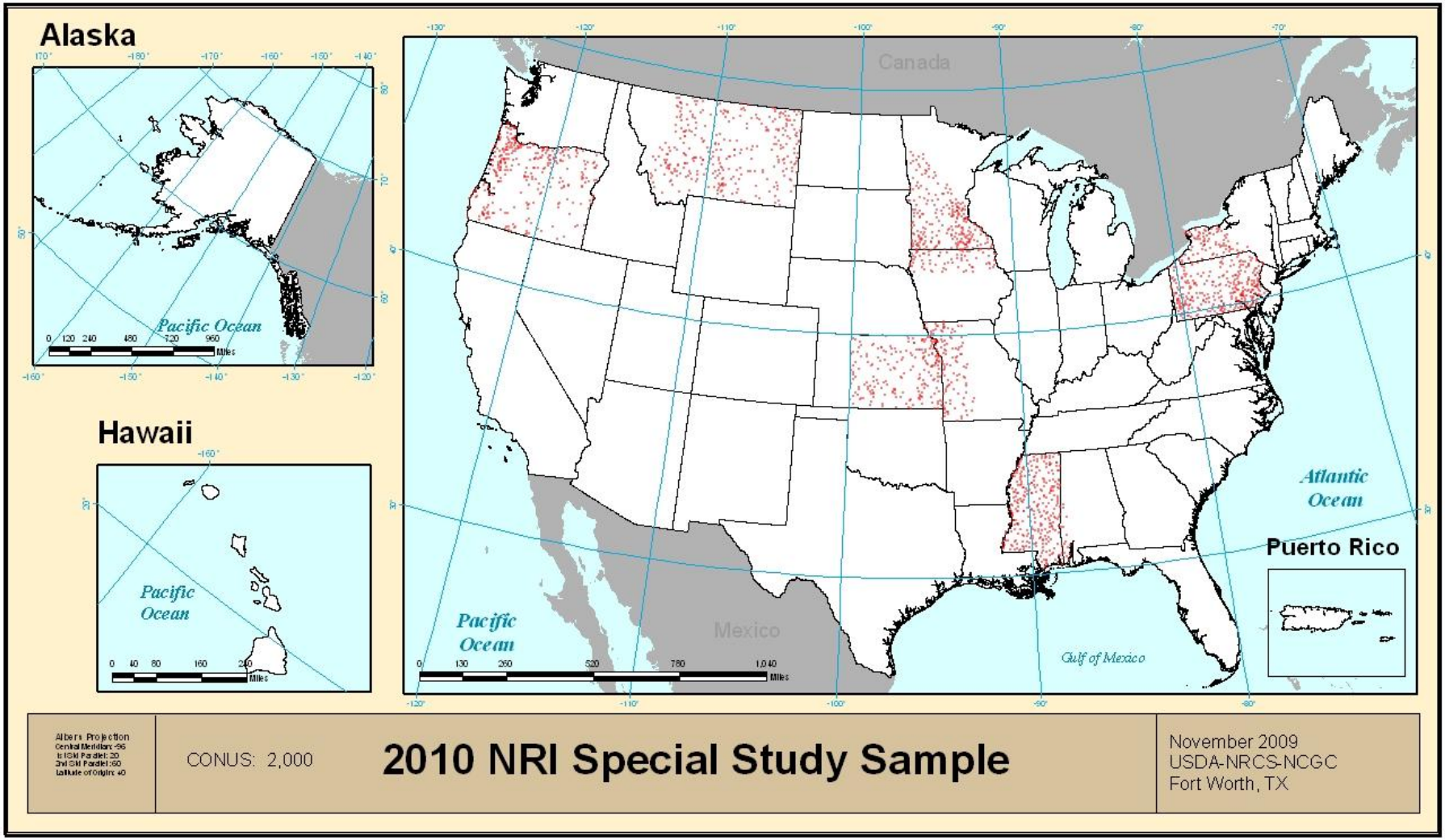


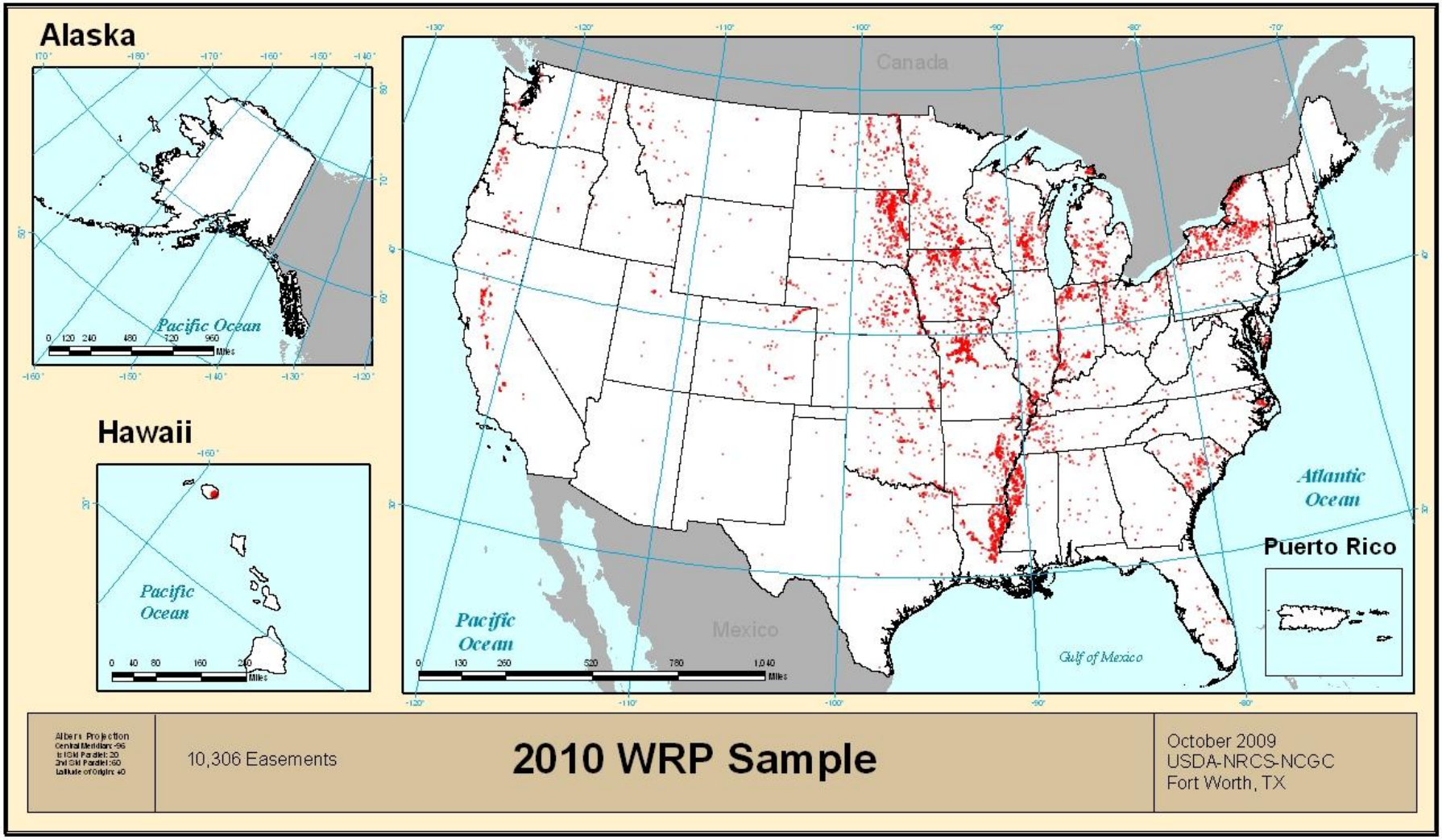
Unflown at end of 2009

102 Bush
12 High Intensity

USDA-NRCS-NCGC, Fort Worth, TX, Oct. 09


Alaska
Pacific Ocean
Hawaii
Pacific Ocean
Canada
Mexico
Pacific Ocean
Gulf of Mexico
Atlantic Ocean
Puerto Rico
Albers Projection
Central Meridian: -96
1st Std Parallel: 20
2nd Std Parallel: 60
Latitude of Origin: 40
CONUS: 70,076
Puerto Rico: 450
Hawaii 375
2010 NRI Sample
October 2009
USDA-NRCS-NCGC
Fort Worth, TX


Alaska
Pacific Ocean
Hawaii
Pacific Ocean
Canada
Mexico
Pacific Ocean
Gulf of Mexico
Atlantic Ocean
Puerto Rico
Albers Projection
CONUS: 2,000
2010 NRI Special Study Sample
November 2009
USDA-NRCS-NCGC
Fort Worth, TX


Alaska
Pacific Ocean
Hawaii
Pacific Ocean
Canada
Mexico
Pacific Ocean
Gulf of Mexico
Atlantic Ocean
Puerto Rico
Albers Projection
Central Meridian: -96
1st Std Parallel: 20
2nd Std Parallel: 60
Latitude of Origin: 40
10,306 Easements
2010 WRP Sample
October 2009
USDA-NRCS-NCGC
Fort Worth, TX

United States Department of Agriculture
Natural Resources Conservation Service

USDA NRCS

2009 Digital Sensor Test

Dorsey Plunk
National Cartography and Geospatial Center

Goals of the Digital Pilot

- Gather requirements for the 2010 USDA Small Area Aerial Photography Contract.
- Acquire multiple resolutions of the same areas to determine which resolution best meets program requirements and best mimics film products.
- Award work to the widest variety of digital sensors for comparison of performance, product quality, and cost.
- Acquire the widest variety of terrain types in different regions of the U.S.
- Acquire as much data as possible based on limits of project funding.

Major Deliverables

- 4-band, 16-bit, georeferenced files (stereo)
- 4-band, 8-bit ortho mosaic, 4 meter absolute horizontal accuracy
- ABGPS/IMU

Digital Pilot Award

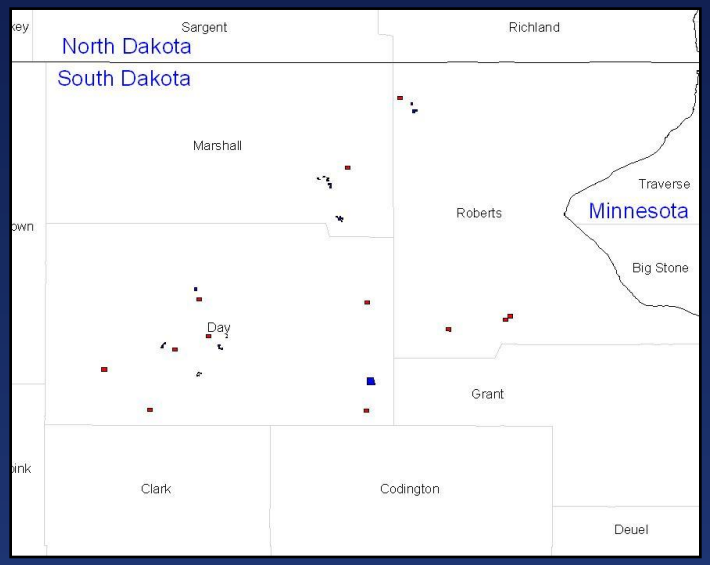
RFQ

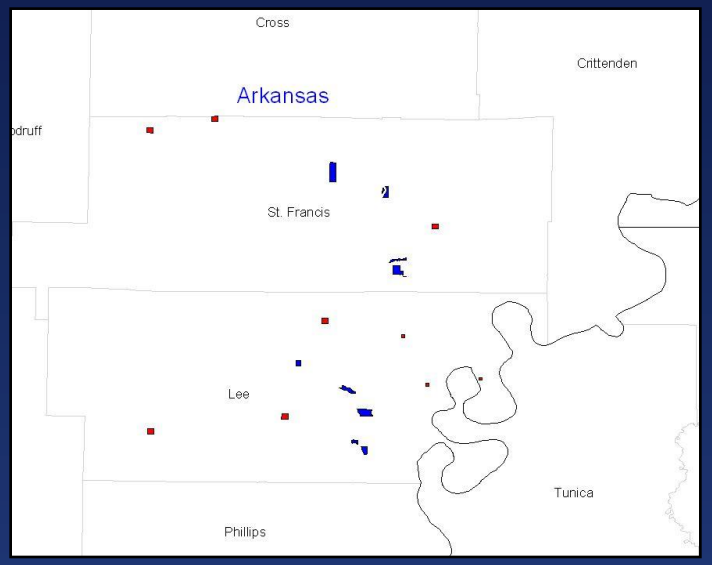
State	NRI	WRP
AR	31	8
CO	39	3
FL	25	5
NY	40	5
OR	23	9
SD	30	10

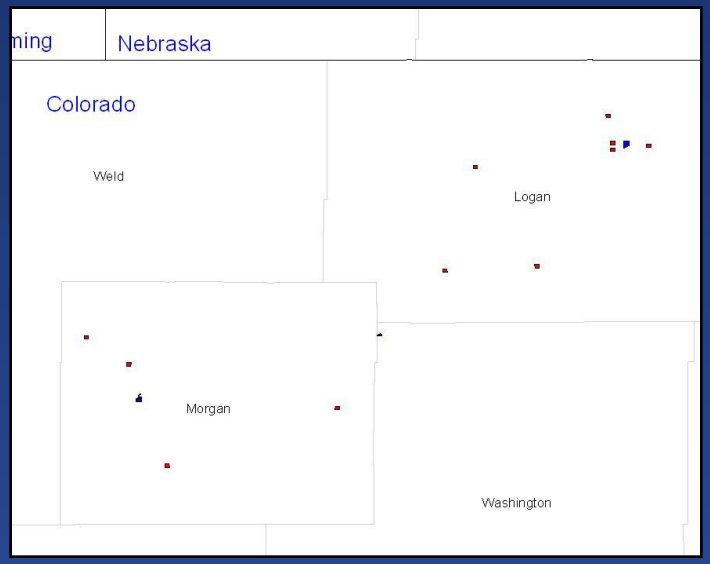
Awarded

State	NRI	WRP
AR	9	8
CO	11	3
FL	0	0
NY	0	0
OR	0	0
SD	12	10

8 bidders. Award made to Sanborn Map Company for $98,252.13







- Arkansas – 9 NRI, 8 WRP
  - DMC, Applanix, Geoscanner
- South Dakota – 12 NRI, 10 WRP
  - DMC and Geoscanner
- Colorado – 11 NRI, 3 WRP
  - Geoscanner

Large, Medium and Small Formats

DMC
- 7,680 x 13,824 pixels
- 4 PAN 7k x 4k camera heads
- 4 MS 3k x 2k camera heads

Applanix DSS 439 Dual Camera
- 5412 x 7216 pixels

Geoscanner
- 3,100 pixels across
- 2 four camera sensors

Resolutions to be Acquired

12” GSD

6” GSD

3” GSD

Arkansas Digital Pilot Costs

GSD/Camera	NRI/site	WRP/acre
3" Geoscanner	$348	$0.79
3" Applanix	$360	$0.95
3" DMC	$504	$1.11
6" Geoscanner	$246	$0.56
6" Applanix	$282	$0.75
6" DMC	$420	$0.93
12" Geoscanner	$158	$0.36
12" Applanix	$234	$0.59
12" DMC	$366	$0.81

16-bit georeferenced stereo tiles and 8-bit ortho mosaic 4-band

2009 NRI Cost
$92.73 w/scan

Pilot Test Tasks

- Contract for imagery and receive deliveries – APFO/NCGC
- Project planning and collaboration – Plunk/Thompson
- NRI and WRP data collection – RSL/CSSM
- Orthorectification – RSL
- Conflation and absolute accuracy – RSL and NCGC
- Qualitative assessment – RSL
- Stereo/16-bit/4-band analysis – NCGC
- Thematic Information Extraction – NCGC
- Infrastructure requirements – NCGC
- Cost effective analysis – NCGC
- Final Report – Plunk/Thompson

Preliminary Findings

- All sensors and resolutions met the horizontal accuracy specification.
- Geoscanner does not acquire data for stereo viewing.
- The Geoscanner has a small footprint and requires numerous flight lines and exposures.
- The DSS can acquire stereo, but wasn't properly configured to do so.
- DSS cannot acquire 4-band, 16-bit data.